

DIVISION ADMINISTRATION DIRECTIVE

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DIVISION OF ANIMAL INDUSTRY SERVICES

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DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

Effective: December 1, 2000

## METHODS PRESCRIBED OR APPROVED FOR ANIMAL EUTHANASIA AND COMPETENCY CERTIFICATION REQUIREMENTS

### I. PURPOSE

This Directive sets forth methods that are currently prescribed and approved by the State Veterinarian for the euthanasia of animals by any person pursuant to the provisions of Title 3.1, Chapter 27.4 of the Code of Virginia (1950), as amended.

### II. AUTHORITY

Title 3.1, Chapter 27.4, Article 4, §3.1-796.96 of the Code of Virginia states, in part, "Any animal destroyed pursuant to the provisions of this chapter shall be euthanized by one of the methods prescribed or approved by the State Veterinarian."

Title 54.1, Chapter 34, §54.1-3425 of the Code of Virginia states, in part, that the Board of Pharmacy "may issue, upon such terms and conditions as it finds proper, to any humane society making application, a limited permit only for the purpose of buying, possessing, and using any drug approved by the State Veterinarian for the purpose of euthanizing injured, sick, homeless, and unwanted domestic pets and animals."

### III. APPROVED METHODS

All euthanasia must be performed humanely by a competency-certified individual using one of the following:

#### A. Routine Euthanasia

All situations – possible exceptions indicated under Emergency Euthanasia.

##### 1. Sodium Pentobarbital, with or without lidocaine

Humanely administered intravenously or intraperitoneally, with or without prior sedation by an approved pre-euthanasia method. Intracardiac administration may be used only when the animal is anesthetized or comatose. (See Appendix B for dosages and further details.)

##### 2. Carbon Monoxide Gas

Humanely administered, commercial-grade gas dispensed from a cylinder into an appropriately constructed and functioning chamber, with or without prior sedation of the animal with acepromazine (See under pre-euthanasia). **NOT APPROVED FOR YOUNG ANIMALS, PUPPIES OR KITTENS UNDER 8 WEEKS OF AGE.** (See Appendix C for chamber and operating requirements and further details.)

3. Drugs and/or Methods

Drugs and/or methods considered and recommended as humane by the most recent report of the American Veterinary Medical Association's Panel on Euthanasia, but only if administered humanely by or under the direct supervision (i.e., in the immediate presence) of a licensed veterinarian.

B. Emergency Euthanasia

When euthanasia is required, no other method of routine euthanasia is possible, and all other conditions for use of the following methods are met.

1. Sodium Pentobarbital, with or without lidocaine

(See Appendix B for route, dosages and further details.)

Recommend the legal provision and use of sodium pentobarbital by animal wardens, animal control officers or other officers for the necessary euthanasia of critically ill or critically injured animals for humane purposes in field situations pursuant to §§3.1-96.96 or 3.1-796.115 of the Code of Virginia. Consult the Virginia Board of Pharmacy for rules and regulations governing the legal procurement, storage and use of this drug in field situations.\

2. Firearms

Approved for use only when all of the following conditions are met:

## a. Euthanasia is performed pursuant to:

- (1) §3.1-796.98 when an animal is "showing active signs of rabies or suspected of having rabies" and for which "confinement is impossible or impracticable," or
- (2) §3.1-796.116 when dogs are "in the act of killing or injuring livestock or poultry";

## b. Accepted or approved methods of humane capture have been reasonably attempted and exhausted, have failed, or are not possible (e.g., when time and physical constraints in emergency situations negate capture as a viable option, as when a dog is in the act of killing or injuring livestock or poultry, or is placing the public or officer in immediate, life-threatening danger as in the case of an animal showing active signs of rabies) and capture is impracticable;

## c. Conditions permit the safe utilization and discharge of a rifle or pistol without jeopardy to the public or other non-targeted animals;

## d. All local and state laws, rules and regulations or ordinances governing the use of firearms are followed;

## e. Euthanasia is performed by a person that is trained and competency-certified in the:

- (1) Use of the firearm to be used,
- (2) Accurate placement of the projectile (i.e., the bullet) in the brain or heart\* of the animal at the appropriate location for the species so as to cause instant unconsciousness or death.

NOTE: Only for animals in field situations in which locating and hitting the brain of the animal by gunshot is not possible or is inappropriate (as in the case of a rabid animal for which the intact brain may be required).

## f. Any animal that can reasonably be considered to be, or is capable of being, under the direct control or custody of the animal warden or animal control officer (including critically ill, critically injured or unweaned animals) are to be euthanized ONLY by means of an approved method of routine euthanasia, i.e., sodium pentobarbital or carbon monoxide, NOT be the use of firearms.

## C. Pre-Euthanasia

The following methods are approved for use ONLY as a means of preliminary sedation of an animal in preparation for and as an aid in the humane euthanasia of an animal, but NOT for use as the primary means of euthanasia.

1. Acepromazine Maleate  
Administered intramuscularly, subcutaneously or orally. See Appendix D for dosages and further details.  
**NOTE:** DO NOT USE THIS DRUG IN ANIMALS (ESPECIALLY CATS) THAT HAVE BEEN GIVEN OR BEEN EXPOSED TO ORGANOPHOSPHATES SUCH AS INSECTICIDES, DIPS, ETC. AS THIS DRUG MAY POTENTIATE SUCH POISONS.
2. Xylazine Hydrochloride (Trade name Rompun)  
Administered intramuscularly (in dogs and cats) or subcutaneously (in dogs only). See Appendix D for dosages and further details.
3. Ketamine Hydrochloride-Promazine Hydrochloride-Aminopeptamide Hydrogen Sulfate Combination (Trade name Ketaset-Plus)  
FOR CATS ONLY. Administered intramuscularly only. See Appendix D for dosages and further details.
4. Sodium Pentobarbital, with or without lidocaine  
Administered intravenously or intraperitoneally. See Appendix D for dosages and further details.

#### IV. GENERAL CONSIDERATIONS FOR EUTHANASIA

- A. According to the 1993 Report of the American Veterinary Medical Association's Panel on Euthanasia, "The need to minimize animal distress, including fear, anxiety, and apprehension, must be considered in determining the method of euthanasia. Distress vocalizations, fearful behavior, and release of certain odors or pheromones by a frightened animal may cause anxiety and apprehension in other animals. Therefore, whenever possible, other animals should not be present when euthanasia is performed, especially euthanasia of the same species."
- B. According to Regulation 2 VAC 5-110-90, B., issued pursuant to §3.1-796.96 of the Code of Virginia, after euthanasia of an animal, death must be positively confirmed before disposal of the carcass. Therefore, each animal is to be carefully examined for:
  1. Lack of heartbeat\*,
  2. Lack of respiration\*, and
  3. Lack of corneal (i.e., eye) and/or toe-pinch reflexes.

\*The use of a stethoscope to check for lack of heartbeat and respiration is quick, inexpensive, easy to learn (suggest learning from a licensed veterinarian), more reliable than visual observation or palpation of the thorax, and should be used.
- C. The approval of any drug, drug combination, euthanizing agent, method of euthanasia or pre-euthanasia medication does NOT sanction the procurement or use of such drugs, agents or methods by any person in violation of state or federal law.

#### V. COMPETENCY CERTIFICATION REQUIREMENTS

Detailed information on the competency certification requirements can be found in the following appendices:

- A. General Provisions – Appendix A
- B. Sodium Pentobarbital – Appendix B
- C. Carbon Monoxide – Appendix C
- D. Pre-euthanasia Methods – Appendix D

VI. **APPROVAL OF ADDITIONAL METHODS AND PROCEDURES**

Advances in animal euthanasia research will be continually monitored by the State Veterinarian and those methods which are proved to be acceptable will be added to the approved list.

Local authorities or individuals seeking approval of specific alternative methods of animal euthanasia may submit a written request for consideration of the proposal to

State Veterinarian/Director  
Division of Animal Industry Services  
P. O. Box 1163  
Richmond, VA 23218

The request must include a detailed explanation of the proposed alternative method, substantive justification for the request, substantive reasons why the currently approved or prescribed methods cannot be used, and how the proposed deviation or alternative will resolve the reasons/problems, and sufficient objective and supportable evidence that the proposed deviation or alternative is at least as humane as the currently approved methods of euthanasia identified in this directive.

Reviewed and approved this 1<sup>st</sup> day of December 2000.

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William M. Sims, Jr., DVM, MS  
State Veterinarian

Attachments: Appendix A  
Appendix B  
Appendix C  
Appendix D

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**APPENDIX A****GENERAL PROVISIONS**

Any animal euthanized is to be euthanized only by a person or by persons that have been certified\* in writing by a Virginia-licensed veterinarian or other qualified individual as being properly trained and competent in the humane restraint and euthanasia of animals by the specific approved method(s) and euthanasia agent(s) used.

**NOTE:** Licensed veterinarians are exempted from this provision, having their competency certified by their Virginia license.

Such written certification of competency is to:

- A. Indicate that, at a specified point in time (i.e., date), the individual (specified by their full name):
  1. Was instructed by an appropriately qualified individual (identified by full name and credentials) in the proper humane restraint and euthanasia of animals, using the approved method(s) and euthanasia agent(s) specified;
  2. Demonstrated to the instructor/certifying veterinarian:
    - a. An understanding of the requirements of this Directive;
    - b. Competence in the humane restraint of animals for the approved method(s) and euthanasia agent(s) to be used;
    - c. Competence in determining the concentration and the appropriate dosage and rate of administration of the approved pre-euthanasia and/or euthanasia agent used;
    - d. Competency in humanely administering the specified approved pre-euthanasia and/or euthanasia agent(s) via approved routes of administration;
    - e. Competency in properly and accurately determining the death of an animal by the lack of a detectable:
      - (1) Heartbeat (by the use of a stethoscope and by thoracic palpation),
      - (2) Respiration (by use of a stethoscope and by thoracic palpation), and
      - (3) Corneal reflex and toe-pinch reflex;
- B. Be signed and dated by the licensed veterinarian attesting to (i.e., 'certifying') the individual's demonstrated competence at that point in time;
- C. Be kept on file at the animal facility as a matter of public record;
- D. Be copied to the Office of the State Veterinarian for file, reference and public information; and
- E. Be renewed at least every three (3) years.

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**APPENDIX B - SODIUM PENTOBARBITAL**

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Sodium Pentobarbital, with or without lidocaine, is the euthanasia agent of choice and is recommended above all others at this time.

**GENERAL INFORMATION AND REQUIREMENTS**

Authorization to procure and use sodium pentobarbital (with or without lidocaine) requires registration with:

Drug Enforcement Agency (DEA)

Washington Field Division

800 K Street, NW

Washington, DC 20001

Phone: 202-305-8800 (Washington)

804-627-6300 (Richmond)

Virginia Department of Health Professions

Board of Pharmacy

6603 W. Broad Street, 5<sup>th</sup> Floor

Richmond, VA 23230

Phone: 804-662-9911

**LEGAL CONSIDERATIONS REGARDING SODIUM PENTOBARBITAL**

- A. According to the Board of Pharmacy, §54.1-3415 of the Code of Virginia authorizes animal control officers/animal wardens and law-enforcement officers "...in the employ of the United States government or of any state, territorial, district, county, municipal, or insular government..." to purchase, receive or possess any approved euthanasia drug for use in the lawful euthanasia of animals "...by reason of his official duties."
- B. According to §54.1-3425 of the Code of Virginia, the Board of Pharmacy "may issue, upon such terms and conditions as it finds proper, to any humane society making application, a limited permit only for the purpose of buying, possessing, and using any drug approved by the State Veterinarian for the purpose of euthanizing injured, sick, homeless, and unwanted domestic pets and animals."
- C. Sodium pentobarbital, in a concentration of not less than 5 grains of sodium pentobarbital per cubic centimeter (i.e., per cc) of water, is to be administered by hypodermic syringe and needle directly into the bloodstream or peritoneal cavity or a properly restrained animal.
- D. Restraint and injection is to be performed by two trained individuals; one to restrain the animal and the other competency-certified to administer the drug(s).

**GENERAL CERTIFICATION REQUIREMENTS****Sodium Pentobarbital, with or without lidocaine**

- A. Certified competency and training for use of this drug is to include a demonstrated knowledge of the requirements of this directive for its use.
- B. The ability to correctly determine the
  - 1. Concentration of the euthanasia solution used and
  - 2. The euthanasia dose of the euthanasia solution used.
- C. The correct gauge of hypodermic needle to be used (e.g., in a puppy, kitten or other young animal, in animals under 20 pounds, in animals 20-35 pounds, in animals 35-50 pounds, and in animals over 50 pounds).

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- D. Intravenous administration is the preferred route of administration and is to be performed ONLY
1. By an operator who is properly trained and competency-certified in intravenous administration of the drug into the jugular vein, cephalic vein, saphenous vein, femoral vein (cats only: not for dogs) or any other readily accessible and appropriate venous site for the species of animal being euthanized;
  2. When the animal is tractable and properly restrained without undue stress; and
  3. When a vein is readily accessible.
- E. Generally, a one-inch, 20- or 22-gauge hypodermic needle is used for injection in dogs weighing 20 or more pounds. Intravenous injection of smaller dogs, cats, kittens, and puppies requires increased expertise and the use of a smaller gauge (e.g., a 24-gauge), one-inch hypodermic needle. However, the smaller gauge needles, such as 24-gauge, makes injection of the sodium pentobarbital through the needle difficult and may cause the needle hub to disconnect from the syringe during injection. Therefore, use of a 24-gauge needle which screws onto the syringe and slow, steady injection may be needed for small animals. In all cases, the gauge or size of the needle used must be the appropriate size (i.e., not too large or too small) for the size of the vein being injected.
- F. The use of eccentric-hubbed syringes for increased ease of inserting the needle into an animal's vein is recommended.
- G. Pre-euthanasia medication may be administered. (See Section III., C.)
1. Before intravenous administration of the euthanasia drug, sedation or anesthetization of the animal with an approved pre-euthanasia medication may be performed and may be needed, especially in fractious, vicious or intractable animals, or in animals with veins that are difficult to identify for injection.
  2. Such pre-euthanasia sedation or anesthetization is to be performed ONLY by individuals who are properly trained and competency-certified in the use and administration of the approved pre-euthanasia medications.
- H. Intravenous Administration  
Certified competency training for the use of this method of administration is to include a demonstrated ability to
1. Properly and humanely restrain an animal for injection into the jugular, cephalic, saphenous and (in cats only) femoral vein; and
  2. Correctly locate and humanely inject into the
    - a. Jugular vein,
    - b. Cephalic vein,
    - c. Saphenous vein, and
    - d. Femoral vein (for cats only).
- I. Intraperitoneal Injection  
Certified competency training for use of this method of administration is to include a demonstrated ability to:
1. Properly and humanely restrain an animal for injection into the peritoneal cavity; and
  2. Correctly locate, and humanely inject into, the peritoneal cavity approximately one-inch behind the umbilicus on the midline.
  3. Intraperitoneal injection may be a preferred route of injection in cats, kittens, small dogs under 20 pounds, puppies, birds and other small animals, or for animals that have small, collapsed or difficult to inject veins.
  4. Intraperitoneal injection is to be performed ONLY
    - a. By a person who is properly trained and competency-certified in the procedure, and
    - b. When the animal is properly restrained.
  5. The usual injection site is approximately one-inch behind the umbilicus on the midline.
  6. Generally, a one-inch, 22- to 24-gauge hypodermic needle may be used in animals weighing under 10 pounds; a one-inch, 22-gauge needle in animals weighing 10-25 pounds, a one-inch, 20-gauge needle in animals weighing 25-45 pounds, and a one-inch 18-20-gauge needle in animals over 45 pounds. (see C.



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5. concerning caution in the use of 24-gauge needles.) In each case, the size and gauge of the needle must be appropriate for the size of the animal.
  7. After intraperitoneal administration of the drug(s), the animal is to be placed in a safe cage or run (preferably in a quiet area) and monitored so that the animal does not inadvertently injure itself by stumbling or falling as unconsciousness develops. The time from injection to unconsciousness to death will differ from animal to animal.
  8. The drug is gradually absorbed through the peritoneum. Therefore, after intraperitoneal injection, the animal gradually enters deeper planes of anesthesia as increasing amounts of the drug enter the bloodstream. Consequently, 30 minutes or more may be required before sufficient drug concentrations are absorbed to induce death. However, the mode of action to induce death is the same as for intravenous administration.
  9. Because of the slow absorption from the peritoneal cavity, and the variability of metabolism in various animals, it is strongly recommended that, once the animal is 'down,' (i.e., sedated, anesthetized or unconscious), that the animal be given a 'follow-up' legal injection of sodium pentobarbital to ensure death.

J. Intracardiac Injection

1. Competency certification to use this method of administration is to include a demonstrated ability to:
  - a. Properly and humanely restrain an animal for intracardiac injection and
  - b. Correctly locate the heart for humane injection in cats, puppies, kittens and other young animals as well as in small (less than 20 pounds), medium (20-40 pounds), and large (>40 pounds) animals.
    - (1) Correctly determine and select the appropriate gauge and length of hypodermic needle for use in young, small, medium and large animals; and
    - (2) Properly and humanely penetrate (i.e., inject) the heart of an animal with one thrust of a hypodermic needle.
2. Intracardiac administration is NOT approved for use unless the animal is fully anesthetized, comatose or unconscious.
3. The animal is to be properly and humanely restrained and the heart must be penetrated with one thrust of the hypodermic needle.



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**APPENDIX C\_ - CARBON MONOXIDE**

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**MINIMUM REQUIREMENTS FOR USE**

- A. Euthanasia of animals with carbon monoxide is to be performed only:
1. By a person who is properly trained and competency-certified in the use of this method of euthanasia;
  2. Using a properly constructed and maintained chamber; and
  3. In accordance with all provisions of this Directive.
- B. The chamber must:
1. Be constructed of durable, easily cleanable material;
  2. Have functioning, internal lighting and at least one clean and transparent view port (i.e. window), both of which are to be used by the operator of the chamber to directly observe and monitor the animals during euthanasia to ensure that euthanasia is occurring properly and humanely; and
  3. Be properly sealed, with such seals properly maintained to enable at least a 6% concentration of the gas to be attained in the chamber within 20 seconds, and to maintain this chamber concentration of the gas until death has occurred.
- C. Only commercial-grade carbon monoxide gas, dispensed from a cylinder, shall be used.
- D. The commercial-grade carbon monoxide gas shall be dispensed from a cylinder into an appropriately constructed, sealed and maintained carbon monoxide chamber at a pressure and rate that achieves a 6% concentration of the gas within the chamber within 20 seconds.
- E. The carbon monoxide gas and chamber is only to be stored and used in a well-ventilated area where the toxic hazards of gas exposure to the operator, to pound/shelter personnel and to pound/shelter animals not intended to be immediately euthanized will be avoided.
- F. Pre-euthanasia sedation with acepromazine maleate, given intramuscularly (See Appendix D), may be performed in dogs and cats 20 minutes prior to subjecting the animal(s) to carbon monoxide euthanasia.

According to Drs. A. Dallaire and A. Chalifoux in their report on the "Physiologic and Behavioral Evaluation of Carbon Monoxide Euthanasia of Adult Dogs – Premedication of Dogs with Acepromazine or Pentazocine Before Euthanasia with Carbon Monoxide" (Canadian Journal of Comparative Medicine, 1985, 49:171-178):

"Acepromazine (at a dosage of 0.3 mg/lb. of body weight)...reduced by 25%...the number of (mongrel) dogs that showed vocalization and agitation. In acepromazine premedicated dogs, the duration of these signs was significantly diminished and sphincter relaxation did not occur in more than 50% of the cases. Furthermore, with the use of acepromazine, no significant peaks or drastic drops were noticed in the heart and respiratory rates and in the arterial blood pressure. These manifestations are usually related to stress. ...

Acepromazine pre-treatment significantly reduced

- (1) the number of dogs showing behavioral manifestations (33.3%) and
- (2) the duration of the behavioral manifestations (39.8%).

...In light of these results, it is recommended to premedicate dogs with acepromazine before submitting them to euthanasia by carbon monoxide."

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- G. Only compatible animals of the same size and species shall be placed into the chamber together.
- H. Animals shall not be crowded together into the chamber. Each animal shall be allowed sufficient space to stand up, sit down and turn around freely using normal body movements and without having to touch another animal in the chamber to do so.
- I. Animals to be euthanized shall not be placed into the chamber with other animals that have already been euthanized.
- J. Each cat shall be placed into the chamber in a separate, lightweight, open-wire cage with a solid metal bottom.
- K. The animal(s) should become unconscious within 45-60 seconds, and death should occur within 2-4 minutes.  
**NOTE:** Some reflex movements and sounds (vocalizations) may occur from the unconscious animals. These vocalizations and movements, made while the animal is passing through what is often called Stage II of anesthesia, should be differentiated from, and should not be confused with, conscious struggling.
- L. Animals should be left in the chamber at least 10 minutes after death has occurred before the chamber is opened.
- M. The operator should open the chamber only in a well-ventilated area, and should leave the animals another 10 minutes after the chamber is opened.
- N. Animals must be carefully examined to ensure that death has indeed occurred.

**GENERAL CERTIFICATION REQUIREMENTS**

Certified competency training in the use of carbon monoxide for euthanasia is to include the following:

- A. A demonstrated understanding of the provisions of Directive 79-1 pertaining to the use of this method of euthanasia.
- B. A demonstrated understanding of the hazards associated with the use of this method and appropriate precautions to be taken when this method of euthanasia is performed.
- C. A demonstrated ability to properly and correctly determine and monitor the rate of flow and concentration of carbon monoxide in the chamber.
- D. A demonstrated ability to correctly operate the chamber.
- E. A demonstrated ability to properly and humanely euthanize animals with carbon monoxide.
- F. A demonstrated ability to correctly evaluate and determine when an animal has been rendered unconscious and has died.

**APPENDIX D – APPROVED PRE-EUTHANASIA METHODS**

- A. These methods are NOT approved as a primary means of euthanasia, but only as a means of preliminary sedation to aid in the humane euthanasia of an animal.

APPROVED DRUG*	SPECIES	ROUTE OF ADMINISTRATION	DOSAGE
Acepromazine maleate	Dogs	Intramuscular or subcutaneous Orally	0.25 to 0.5 mg/lb. 0.25 to 1 mg/lb.
	Cats	Intramuscular or subcutaneous Orally	0.5 to 1 mg/lb. 0.5 to 1 mg/lb.
Xylazine hydrochloride	Dogs less than 50 lb.	Intramuscular or subcutaneous	1 mg/lb.*
	Dogs more than 50 lb.	Intramuscular	0.5 mg/lb.*
	Cats	Intramuscular	1 mg/lb
Ketamine hydrochloride	Cats	Intramuscular	5 to 15 mg/lb.
	Non-human primates	Intramuscular	3 to 15 mg/lb.
Ketamine HCL, Promazine HCL and Aminopentamide hydrogen sulfate combination (i.e., Ketaset-Plus)	Cats	Intramuscular	15 to 20 mg/lb.
Sodium pentobarbital** (with or without lidocaine)	Any animal	Intravenous	0.2 cc/10 lbs.**
	Young, small, fractious, ill or injured animals	Intraperitoneal	0.6cc/10 lbs.**

\*Species, route and dosages approved by the FDA and listed in the manufacturers' recommendations.

\*\*Assuming the use of a 5 grain/ml. Concentration of sodium pentobarbital.

- B. Pre-euthanasia sedation is not be administered only:
1. By individuals that are properly trained and competency-certified to use and administer the approved pre-euthanasia drugs;
  2. In the species in which the FDA has approved the drug(s) for use;
  3. Via an approved route of administration for the species being given the approved drug; and
  4. When the animal is being properly and humanely restrained by a person who is trained in the proper restraint of the animal for injection via the approved route of administration to be utilized.
- C. Competency certification for pre-euthanasia is to include:
1. A demonstrated knowledge of the requirements of this Directive regarding the use of the approved pre-euthanasia drugs;
  2. A demonstrated knowledge and ability to correctly determine the:
    - a. Concentration of the approved pre-euthanasia drug to be used;
    - b. Dose of the approved pre-euthanasia drug required; and,
    - c. Humane administration of the drug by the approved route(s) of administration to be used.